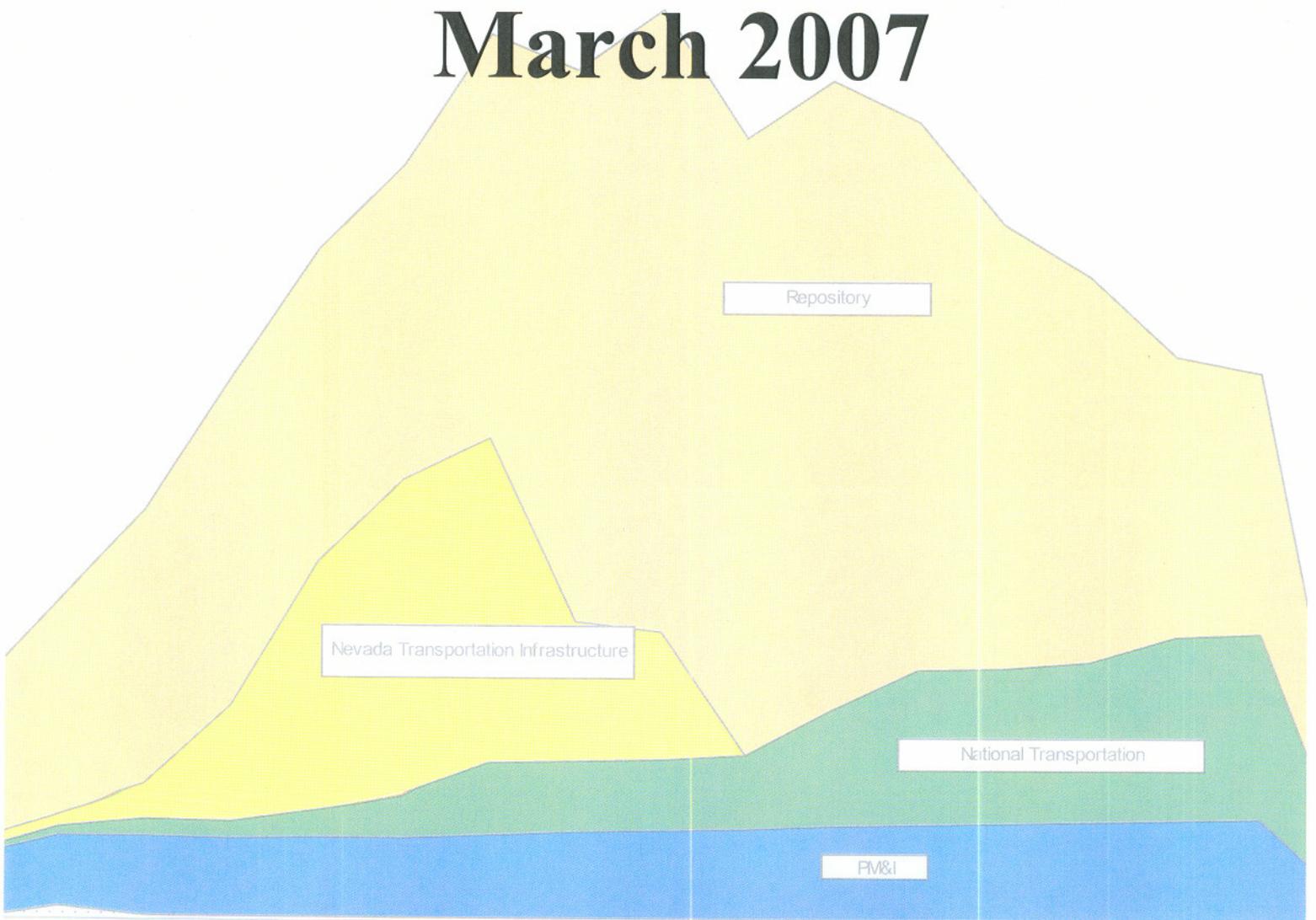


OCRWM Budget Projection FY 2009 – FY 2023 Executive Summary

March 2007



Office of Civilian Radioactive Waste Management (OCRWM)
National High-Level Radioactive Waste Repository
BUDGET PROJECTION
FY 2009-FY 2023

BACKGROUND

On July 19, 2006, in testimony before the Subcommittee on Energy and Air Quality, Committee on Energy and Commerce, U.S. House of Representatives, the OCRWM Director presented a schedule for the national high-level radioactive waste repository Program. At that hearing, the Director was requested to provide an updated budget authority requirements projection for building the repository in accordance with the revised schedule. This document is in response to that request.

Assuming a license application submittal not later than June 30, 2008, as currently planned, the Best-Achievable Schedule for commencing repository operations is March 2017. This Best-Achievable Schedule is predicated on the following:

- Enactment of the Administration's proposed legislation entitled "Nuclear Waste Management and Disposal Act"
- Appropriations by Congress consistent with the annual budget projections contained in this document
- Issuance by the Nuclear Regulatory Commission (NRC) of a construction authorization within the three-year period specified in the Nuclear Waste Policy Act
- The timely issuance of all other necessary authorizations and permits, and the absence of litigation-related delays

This document summarizes annual budget projections (in year of expenditure capital dollars) of integrated Program needs through completion of the repository surface facilities in December 2021. By this date, all repository facilities would be operational, but not all of the underground emplacement drifts will have been excavated. The total budget projection is approximately \$18.5 billion.

This budget projection includes costs for: design and construction of repository surface facilities (buildings to receive and handle the waste stream); subsurface design and construction (access tunnels and emplacement drifts); design and fabrication of waste packages and Transport, Aging, and Disposal (TAD) canisters; design and construction of the aging pads; design and construction of the Nevada transportation infrastructure, including a rail line within Nevada to Yucca Mountain; design of specialized train cars and acquisition of the rail cars needed for initial operations; and costs for Program management and integration.

Operational costs are estimated at \$8.4 billion for FY 2016 through FY 2023.

Included in the estimates are funds for contingency and management reserve such that the estimates provide an 80 percent confidence level, i.e., that there is an 80 percent probability that the costs will be at or less than the figures provided.

These figures will be used to develop a revised Total System Life Cycle Cost estimate that will be submitted to Congress later this year.

SUMMARY OF COSTS (\$ in billions)

Total to complete operational facilities and transportation infrastructure	\$18.5
Operational costs – 2016-2023	<u>8.4</u>
 TOTAL – 2009-2023	 \$26.9

MAJOR MILESTONES

These major milestones are based on factors within the control of the Department of Energy, appropriations consistent with optimum project execution, issuance of an NRC construction authorization consistent with the three-year period specified in the Nuclear Waste Policy Act, and timely issuance by the NRC of a license to receive and possess waste.

June 2008	DOE Submits License Application to NRC
September 2011	NRC Issues Construction Authorization
June 2014	Nevada Rail Line Operational
March 2017	Begin Receipt
December 2021	All Repository Facilities Operational

BUDGET PROJECTION

The budget projection is displayed graphically in Figure 1-1, OCRWM Capital Budget Projection Tier 1.

Repository costs, shown in orange, include development of the license application and Licensing Support Network; engineering, procurement, and construction of the surface facilities (including Canister Receipt and Closure Facility, Wet Handling Facility, Initial Handling Facility, Receipt Facility) and subsurface facilities needed for Initial Operating Capability (main access tunnels and emplacement drifts); design and procurement of the waste package; physical security systems; and Program management.

Nevada Transportation Infrastructure costs, shown in yellow, include design and construction of the Nevada rail line and rail support facilities (Interchange Facility, End-of-Line Facility, Maintenance of Way Facilities, Train Control Center); field investigations; and the Yucca Mountain Rail Corridor and Rail Alignment Environmental Impact Statement.

National Transportation costs, shown in green, include development of specifications and acquisition of rail and truck cask systems; design, acquisition, manufacture, testing and acceptance of rolling stock; acquisition of TAD canisters needed for Initial Operating Capability in 2017; national institutional activities, including implementation of the Nuclear Waste Policy Act's 180(c) provisions; physical security systems, and project management.

Project Management and Integration (PM&I) costs, shown in blue, include waste acceptance activities; design, development, and certification of TAD canisters; quality assurance; physical security systems; program support; and program direction.

Table 1, in the first block of numbers, shows the capital cost estimates of \$18.5 billion displayed in Figure 1-1. The second block of numbers shows operating cost estimates between FY 2016 and FY 2023 of \$8.4 billion. The third block of numbers sums the capital and operating costs of \$26.9 billion.

Table 2 shows a further breakdown of the major cost categories in Table 1, as displayed in Figure 2.

Figure 2 displays the same costs as Figure 1-1, but in greater level detail, and is entitled OCRWM Capital Budget Projection Tier 2.

KEY ASSUMPTIONS

All amounts represent required Budget Authority (BA), in year of expenditure dollars.

The budget projection is based on projected funding requirements for construction of the repository and the transportation infrastructure needed to meet the Best-Achievable Schedule repository opening date of March 2017.

Costs for Nevada rail are based on the Caliente corridor.

Dedicated trains will be used.

Locomotives will not be purchased, but leased.

Navy will provide their own rolling stock, so those costs are excluded.

Costs for design and procurement of the escort cars will be shared with the Navy.

Cask and rolling stock maintenance facilities will be constructed at Yucca Mountain.

BASIS OF ESTIMATE

Estimates were developed by OCRWM contractors doing the design work. Repository cost estimates were “bottoms up,” since that design is the most advanced. Cost estimates for Nevada and National Transportation were based on commercial industry standards. An independent “reasonableness review” was conducted by an independent major engineering/construction firm.

This budget projection represents the best available information. Each year’s delay beyond the March 2017 date will result in increased potential taxpayer liability to utility contract holders, as well as in increased costs for storage at defense waste sites across the country. Those costs are not included in this budget projection.

Figure 1-1

OCRWM Capital Budget Projection Tier 1 (Year of Expenditure \$K)

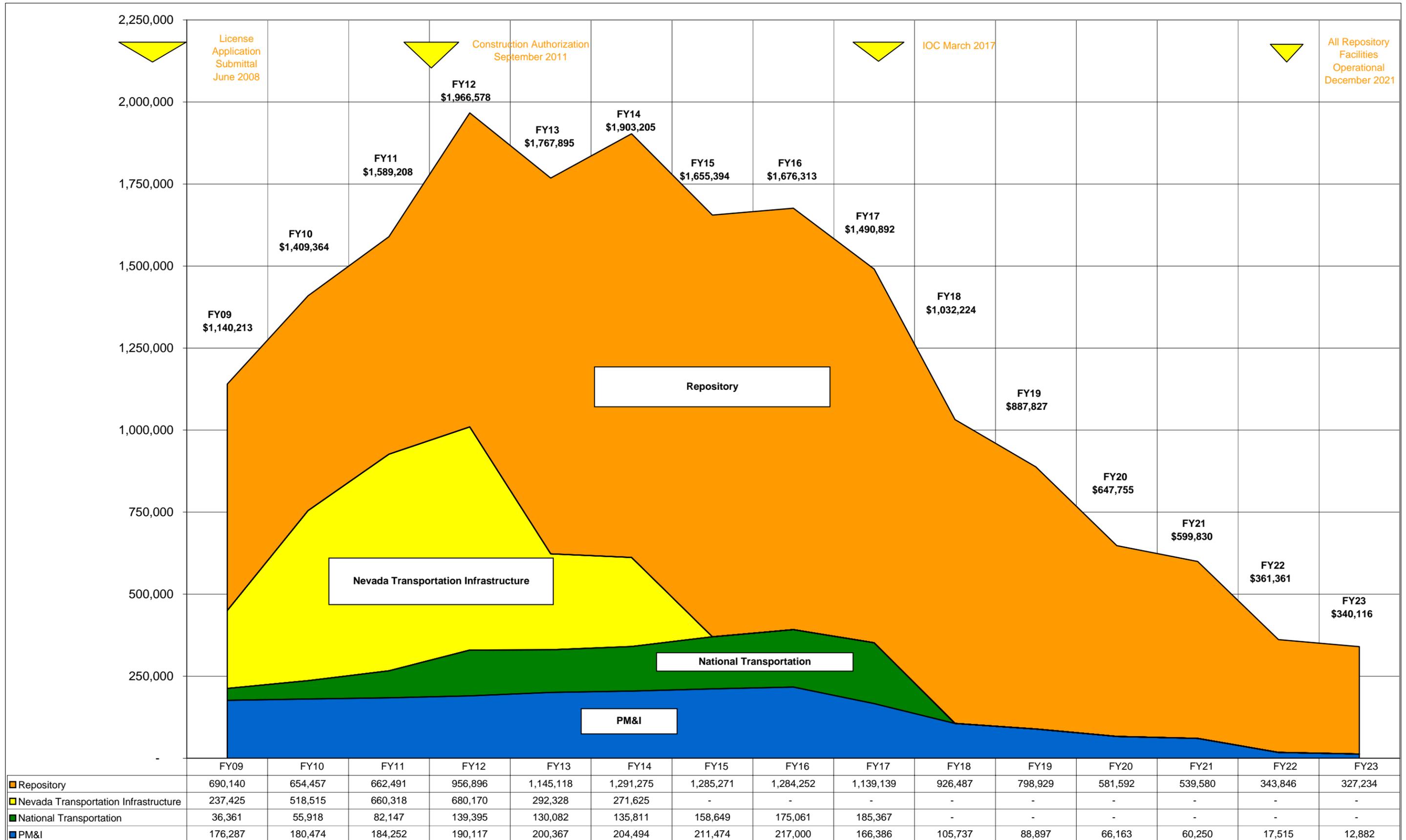


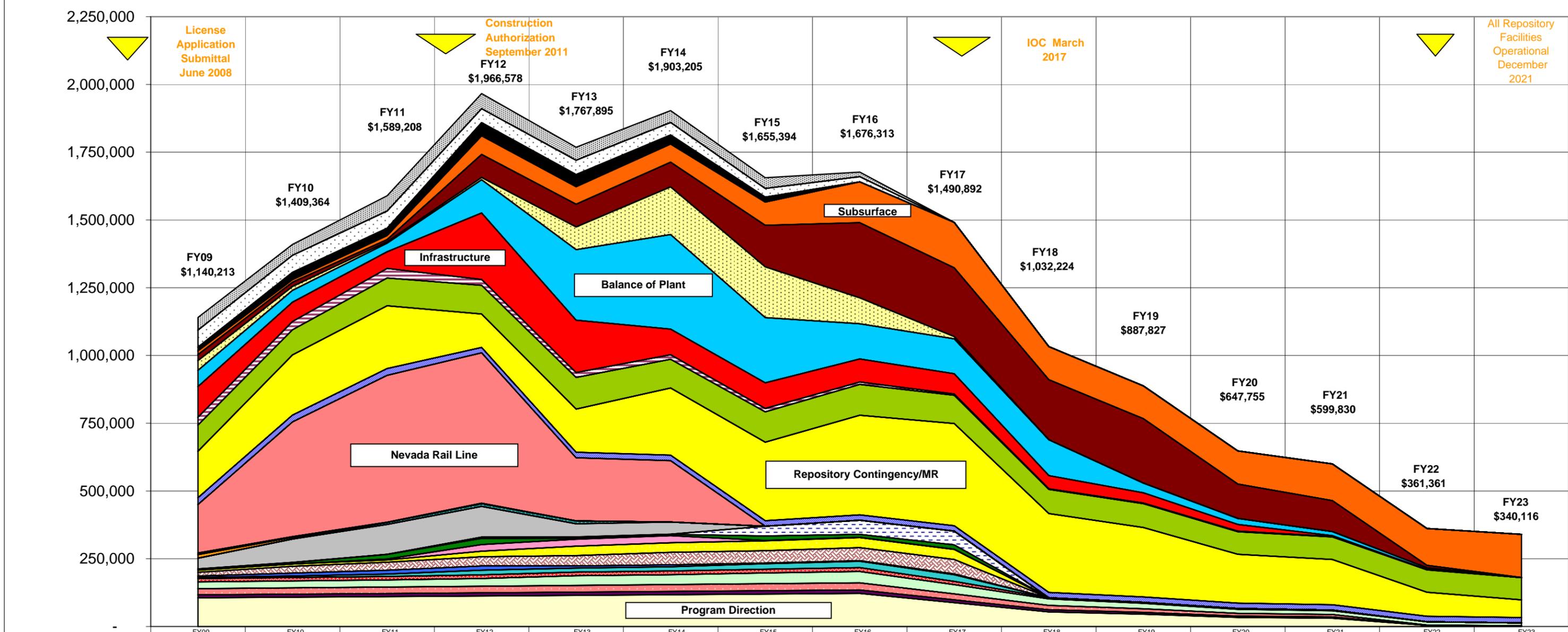
Table 1

OCRWM Tier 1 Capital and Operating Budget Projection (Year of Expenditure \$K)

	<u>FY09</u>	<u>FY10</u>	<u>FY11</u>	<u>FY12</u>	<u>FY13</u>	<u>FY14</u>	<u>FY15</u>	<u>FY16</u>	<u>FY17</u>	<u>FY18</u>	<u>FY19</u>	<u>FY20</u>	<u>FY21</u>	<u>FY22</u>	<u>FY23</u>	<u>Total</u>
BLOCK 1 - Capital cost estimates of \$18.5 billion (Figure 1-1)																
<u>Capital Budget Projection</u>																
PM&I	176,287	180,474	184,252	190,117	200,367	204,494	211,474	217,000	166,386	105,737	88,897	66,163	60,250	17,515	12,882	2,082,297
National Transportation	36,361	55,918	82,147	139,395	130,082	135,811	158,649	175,061	185,367	-	-	-	-	-	-	1,098,791
Nevada Transportation Infrastructure	237,425	518,515	660,318	680,170	292,328	271,625	-	-	-	-	-	-	-	-	-	2,660,381
Repository	690,140	654,457	662,491	956,896	1,145,118	1,291,275	1,285,271	1,284,252	1,139,139	926,487	798,929	581,592	539,580	343,846	327,234	12,626,706
Total OCRWM Capital Budget Projection	1,140,213	1,409,364	1,589,208	1,966,578	1,767,895	1,903,205	1,655,394	1,676,313	1,490,892	1,032,224	887,827	647,755	599,830	361,361	340,116	18,468,175
Total Cum Budget Projection	1,140,213	2,549,577	4,138,785	6,105,363	7,873,258	9,776,464	11,431,858	13,108,172	14,599,063	15,631,287	16,519,114	17,166,869	17,766,699	18,128,059	18,468,175	
BLOCK 2 - Operating cost estimates between FY 2016 and FY 2023																
<u>Operating Budget Projection</u>																
PM&I	-	-	-	-	-	-	-	-	27,734	57,557	80,322	109,242	124,022	160,729	176,715	736,321
National Transportation	-	-	-	-	-	-	-	119,028	222,421	491,093	522,668	631,951	664,507	621,693	634,294	3,907,655
Nevada Transportation Infrastructure	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Repository	-	-	-	-	-	-	-	-	128,661	316,690	447,287	559,504	676,105	781,948	839,339	3,749,534
Total OCRWM Operating Budget Projection	-	119,028	378,816	865,340	1,050,277	1,300,697	1,464,634	1,564,370	1,650,348	8,393,510						
Total Cum Operating Budget Projection	-	119,028	497,844	1,363,184	2,413,461	3,714,158	5,178,792	6,743,162	8,393,510							
BLOCK 3 - Total capital and operating costs of the Project																
<u>Grand Total Budget Projection</u>																
PM&I	176,287	180,474	184,252	190,117	200,367	204,494	211,474	217,000	194,120	163,294	169,219	175,405	184,272	178,244	189,597	2,629,021
National Transportation	36,361	55,918	82,147	139,395	130,082	135,811	158,649	175,089	407,788	491,093	522,668	631,951	664,507	621,693	634,294	4,372,152
Nevada Transportation Infrastructure	237,425	518,515	660,318	680,170	292,328	271,625	-	-	-	-	-	-	-	-	-	2,660,381
Repository	690,140	654,457	662,491	956,896	1,145,118	1,291,275	1,285,271	1,284,252	1,267,800	1,243,177	1,246,216	1,141,096	1,215,685	1,125,794	1,166,573	15,209,667
Grand Total OCRWM Budget Projection	1,140,213	1,409,364	1,589,208	1,966,578	1,767,895	1,903,205	1,655,394	1,795,341	1,869,708	1,897,564	1,938,104	1,948,452	2,064,464	1,925,731	1,990,464	26,861,685
Total OCRWM Cum Budget Projection	1,140,213	2,549,577	4,138,785	6,105,363	7,873,258	9,776,464	11,431,858	13,227,200	15,096,907	16,994,471	18,932,575	20,881,027	22,945,491	24,871,221	26,861,685	

Figure 2

OCRWM Capital Budget Projection Tier 2 (Year of Expenditure \$K)



	FY09	FY10	FY11	FY12	FY13	FY14	FY15	FY16	FY17	FY18	FY19	FY20	FY21	FY22	FY23
License	46,829	39,589	56,520	55,792	47,899	43,286	39,416	16,610	-	-	-	-	-	-	-
Safety Analysis	62,407	63,133	62,997	51,479	52,676	46,340	31,785	19,142	-	-	-	-	-	-	-
Waste Package	13,759	26,748	27,041	48,831	44,695	33,221	18,498	60	56	-	-	-	-	-	-
Sub Surface	14,155	9,569	15,348	68,739	64,299	67,384	85,175	150,412	167,211	121,640	120,911	122,205	135,580	135,942	159,647
Canister Handling Facilities (CRCF/RF)	22,201	15,492	7,373	85,070	84,001	90,574	153,757	277,439	254,167	221,923	237,631	126,743	114,172	8,465	-
Fuel Handling Facilities (WHF/IHF)	35,532	14,434	5,363	7,969	84,098	176,135	187,173	95,836	8,317	-	-	-	-	-	-
Balance of Plant	60,336	43,736	32,130	123,025	260,123	348,982	240,458	129,534	128,316	131,786	35,782	22,290	14,945	6,458	305
Infrastructure	112,583	71,378	61,196	245,268	193,635	94,985	94,710	85,259	74,899	48,816	38,109	24,438	3,157	-	-
YMP Project Support	28,969	30,638	35,248	21,617	17,754	16,354	12,697	8,784	5,132	2,471	2,526	2,481	1,626	1,333	-
YMP Non- M&O Contractors	97,069	92,540	102,375	106,106	116,938	106,014	111,602	114,176	104,041	88,851	87,970	83,435	83,100	82,648	82,282
Repository Contingency/MR	171,300	222,200	231,900	123,000	159,000	248,000	290,000	367,000	377,000	291,000	256,000	180,000	167,000	89,000	65,000
Contractor Fee	25,000	25,000	25,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000
Nevada Rail Line	178,724	423,262	541,653	554,958	233,030	226,354	-	-	-	-	-	-	-	-	-
Nevada Rail EIS	5,967	2,909	1,491	1,528	-	-	-	-	-	-	-	-	-	-	-
Design/EIS Field Investigations/Analyses	13,163	5,925	-	-	-	-	-	-	-	-	-	-	-	-	-
Rail Support Facilities	-	-	7,121	10,322	10,577	-	-	-	-	-	-	-	-	-	-
Nevada Rail Contingency/MR	39,571	86,419	110,053	113,362	48,721	45,271	-	-	-	-	-	-	-	-	-
Casks	2,011	440	451	4,562	4,674	486	35,911	51,905	50,735	-	-	-	-	-	-
Rolling Stock	2,423	5,244	16,861	22,830	3,968	4,762	17,070	11,484	16,357	-	-	-	-	-	-
National Transportation Support Facilities	430	440	3,833	24,373	25,251	26,077	910	510	523	-	-	-	-	-	-
National Transportation Institutional	8,074	8,268	8,473	20,503	34,727	35,586	36,468	37,371	36,910	-	-	-	-	-	-
National Transportation Operations	13,629	24,902	29,143	33,701	38,454	45,693	45,670	47,529	53,206	-	-	-	-	-	-
National Transportation Management	5,282	10,945	14,152	15,692	7,843	7,363	2,404	2,731	2,835	-	-	-	-	-	-
National Transportation Contingency/MR	4,512	5,679	9,234	17,734	15,165	15,844	20,216	23,531	24,801	-	-	-	-	-	-
Waste Acceptance	11,889	12,174	12,476	12,784	13,100	13,424	13,757	14,098	11,658	3,976	3,357	2,507	2,290	299	-
Program Support	25,066	26,048	26,516	29,003	35,802	36,403	39,777	41,620	34,356	24,236	20,295	15,097	13,741	11,537	10,500
S&T	22,497	23,037	23,608	24,192	24,790	25,403	26,033	26,677	22,063	15,913	13,435	10,032	9,165	1,197	626
QA	10,755	11,013	11,286	11,565	11,851	12,144	12,445	12,754	10,547	7,607	6,423	4,796	4,381	572	626
Program Direction	106,080	108,202	110,366	112,573	114,824	117,120	119,462	121,851	87,763	54,005	45,388	33,732	30,674	3,910	1,130

Table 2

OCRWM Capital Budget Projection Tier 2 (Year of Expenditure \$K)
(Further breakdown of major cost categories in Table 1 as displayed in Figure 2)

	<u>FY09</u>	<u>FY10</u>	<u>FY11</u>	<u>FY12</u>	<u>FY13</u>	<u>FY14</u>	<u>FY15</u>	<u>FY16</u>	<u>FY17</u>	<u>FY18</u>	<u>FY19</u>	<u>FY20</u>	<u>FY21</u>	<u>FY22</u>	<u>FY23</u>	<u>Total</u>
Program Direction	106,080	108,202	110,366	112,573	114,824	117,120	119,462	121,851	87,763	54,005	45,388	33,732	30,674	3,910	1,130	1,167,081
QA	10,755	11,013	11,286	11,565	11,851	12,144	12,445	12,754	10,547	7,607	6,423	4,796	4,381	572	626	128,766
S&T	22,497	23,037	23,608	24,192	24,790	25,403	26,033	26,677	22,063	15,913	13,435	10,032	9,165	1,197	626	268,666
Program Support	25,066	26,048	26,516	29,003	35,802	36,403	39,777	41,620	34,356	24,236	20,295	15,097	13,741	11,537	10,500	389,996
Waste Acceptance	11,889	12,174	12,476	12,784	13,100	13,424	13,757	14,098	11,658	3,976	3,357	2,507	2,290	299	-	127,789
Casks	2,011	440	451	4,562	4,674	486	35,911	51,905	50,735	-	-	-	-	-	-	151,175
Rolling Stock	2,423	5,244	16,861	22,830	3,968	4,762	17,070	11,484	16,357	-	-	-	-	-	-	100,999
National Transportation Support Facilities	430	440	3,833	24,373	25,251	26,077	910	510	523	-	-	-	-	-	-	82,347
National Transportation Institutional	8,074	8,268	8,473	20,503	34,727	35,586	36,468	37,371	36,910	-	-	-	-	-	-	226,380
National Transportation Operations	13,629	24,902	29,143	33,701	38,454	45,693	45,670	47,529	53,206	-	-	-	-	-	-	331,927
National Transportation Management	5,282	10,945	14,152	15,692	7,843	7,363	2,404	2,731	2,835	-	-	-	-	-	-	69,247
National Transportation Contingency/MR	4,512	5,679	9,234	17,734	15,165	15,844	20,216	23,531	24,801	-	-	-	-	-	-	136,716
Nevada Rail Line	178,724	423,262	541,653	554,958	233,030	226,354	-	-	-	-	-	-	-	-	-	2,157,981
Nevada Rail EIS	5,967	2,909	1,491	1,528	-	-	-	-	-	-	-	-	-	-	-	11,895
Design/EIS Field Investigations/Analyses	13,163	5,925	-	-	-	-	-	-	-	-	-	-	-	-	-	19,088
Rail Support Facilities	-	-	7,121	10,322	10,577	-	-	-	-	-	-	-	-	-	-	28,020
Nevada Rail Contingency/MR	39,571	86,419	110,053	113,362	48,721	45,271	-	-	-	-	-	-	-	-	-	443,397
License	46,829	39,589	56,520	55,792	47,899	43,286	39,416	16,610	-	-	-	-	-	-	-	345,941
Safety Analysis	62,407	63,133	62,997	51,479	52,676	46,340	31,785	19,142	-	-	-	-	-	-	-	389,959
Waste Package	13,759	26,748	27,041	48,831	44,695	33,221	18,498	60	56	-	-	-	-	-	-	212,909
Sub Surface	14,155	9,569	15,348	68,739	64,299	67,384	85,175	150,412	167,211	121,640	120,911	122,205	135,580	135,942	159,647	1,438,217
Canister Handling Facilities (CRCF/RF)	22,201	15,492	7,373	85,070	84,001	90,574	153,757	277,439	254,167	221,923	237,631	126,743	114,172	8,465	-	1,699,008
Fuel Handling Facilities (WHF/IHF)	35,532	14,434	5,363	7,969	84,098	176,135	187,173	95,836	8,317	-	-	-	-	-	-	614,857
Balance of Plant	60,336	43,736	32,130	123,025	260,123	348,982	240,458	129,534	128,316	131,786	35,782	22,290	14,945	6,458	305	1,578,206
Infrastructure	112,583	71,378	61,196	245,268	193,635	94,985	94,710	85,259	74,899	48,816	38,109	24,438	3,157	-	-	1,148,433
YMP Project Support	28,969	30,638	35,248	21,617	17,754	16,354	12,697	8,784	5,132	2,471	2,526	2,481	1,626	1,333	-	187,630
YMP Non- M&O Contractors	97,069	92,540	102,375	106,106	116,938	106,014	111,602	114,176	104,041	88,851	87,970	83,435	83,100	82,648	82,282	1,459,146
Repository Contingency/MR	171,300	222,200	231,900	123,000	159,000	248,000	290,000	367,000	377,000	291,000	256,000	180,000	167,000	89,000	65,000	3,237,400
Contractor Fee	25,000	25,000	25,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	315,000
Total Annualized Budget Projection	1,140,213	1,409,364	1,589,208	1,966,578	1,767,895	1,903,205	1,655,394	1,676,313	1,490,892	1,032,224	887,827	647,755	599,830	361,361	340,116	18,468,175
Total Cum Budget Projection	1,140,213	2,549,577	4,138,785	6,105,363	7,873,258	9,776,464	11,431,858	13,108,172	14,599,063	15,631,287	16,519,114	17,166,869	17,766,699	18,128,059	18,468,175	